



Department of Defense Research & Engineering

Department of Defense

The 2008 Modeling and Simulation Corporate and Crosscutting Business Plan

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The 2008 DoD Modeling and Simulation Corporate and Crosscutting Business Plan



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Strategic Vision for DoD Modeling and Simulation

Empower DoD with modeling and simulation capabilities that effectively and efficiently support the full spectrum of the Department's activities and operations.



-- Modeling and Simulation (M&S) Steering Committee, August 2007--

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Foreword

This business plan guides investment and management priorities for Department of Defense Modeling and Simulation (M&S) efforts. In recent years it became evident to DoD senior leaders that the original approach for managing the Modeling and Simulation (M&S) enterprise did not sufficiently address the myriad of challenges facing the M&S community in the 21st Century. Both the 2006 Quadrennial Defense Review and the FY 2006 Program Review/PDM mandated a new approach to reenergize DoD M&S collaboration and management. Since that time, the Department has made significant progress in the management and employment of M&S capabilities. Evidence of this progress includes the recently published DoD Directive 5000.59, the stand up of the Modeling and Simulation Steering Committee, the Modeling and Simulation Integrated Process Team and the establishment of the Modeling and Simulation Coordination Office.

This document fosters coordination of the Services and communities empowered by M&S to improve standards and increase visibility and interoperability. Throughout this plan's development, careful measures ensured the end result was an enterprise-wide effort. That is, goals detailed throughout this plan are closely aligned with and support the goals set forth in DoD strategic documents including, the 2006 QDR, the National Defense Strategy, the Acquisition, Technology and Logistics Strategic Goals Implementation Plan and DDR&E Strategic Plan.

The coordination of goals, plans and other efforts, though proving to be excellent in facilitating better integration of M&S, are only the beginning. Changes in the operating environment and the needs of the force require a continued focus on developing corporate and cross-cutting business practices to improve visibility, accessibility, commonality, reuse and interoperability of M&S tools, data and services. These efforts will allow users to quickly assemble models and simulations to create credible combinations of live, virtual and constructive representations of the operating environment. It will also allow DoD leadership to efficiently manage the billions of dollars spent annually on M&S. As referenced in the FY 2008 National Defense Authorization Act (NDAA), this business plan specifies DoD M&S will effectively manage and coordinate the \$2.2 billion annual investment in joint M&S activities. Continued investment will yield increased opportunities for developing tools, data and services to address challenges currently facing our nation and anticipate future challenges.

The core of the Business Plan is the Strategic Objectives section which defines the M&S priorities over the next 24 months and the High Level Tasks which serve as focal points for M&S investments. This plan is a living document and will be reviewed and updated biennially. An accompanying M&S Implementation Plan will also be published which identifies capabilities and gaps, actions, and executes the High Level Tasks identified in the Business Plan.



Alan R. Shaffer

Principal Deputy



Purpose

The 2008 Modeling and Simulation (M&S) Corporate and Crosscutting Business Plan establishes the strategic direction for M&S activities and investments across the Department of Defense (DoD). It encompasses the M&S Vision and Goals, the cumulative direction of DoD investments, plans, programs and Objectives identified collectively by the Modeling and Simulation Steering Committee (M&S SC).¹ This plan implements policy in DoD Directive 5000.59, “DoD Modeling and Simulation (M&S) Management,” and provides a basis for developing supporting plans and programs.



M&S supports real-world applications that preserve taxpayer dollars and accelerate the search for solutions to national challenges.

Background

The discipline of M&S enables capabilities that are critical to meet DoD challenges. Historically, Defense modeling and simulation has focused on the representation of conventional and nuclear warfare using physics-based modeling and force-on-force modeling. These methods provided M&S capabilities to the Department for the training, equipping and deploying of the U.S. forces to meet conventional threats.

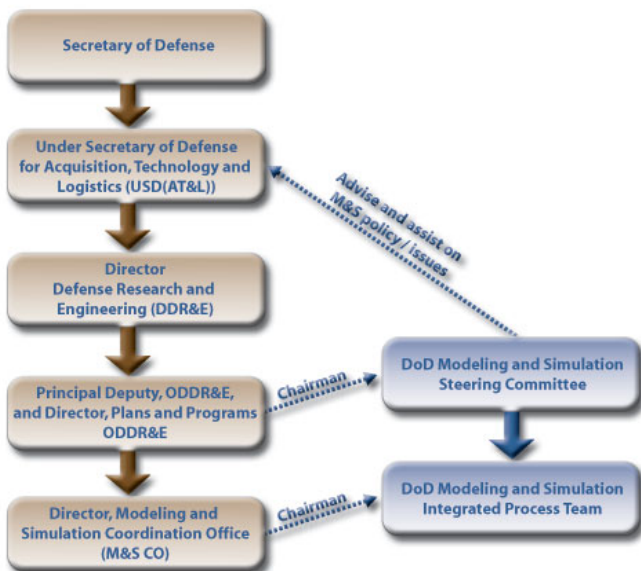
Today, the battlespace in which U.S. forces, allies and coalition partners operate is markedly different. Among the changes taking place are the rise in Irregular Warfare (IW) activities by both state and non-state actors, and the increase in requirements to support stability, security, transition and reconstruction activities (SSTR). An additional challenge is applying the social science theories behind Human, Social, Cultural and Behavior (HSCB) research to develop new M&S capabilities that support DoD Irregular Warfare efforts. These are a few of the factors driving the increased demand for modeling and simulation capabilities.

¹ The Modeling and Simulation Steering Committee (M&S SC) advises and assists the USD (AT&L) in all matters related to M&S while providing oversight and strategic governance of DoD M&S capabilities and resources. DoDD 5000-59, “Modeling and Simulation (M&S) Management,” page 3.

Program Governance

The Department of Defense reorganized the governance structure related to M&S activities beginning in 2006. A Modeling and Simulation Coordination Office (M&S CO) was designated and established in October 2006. In August 2007, DoD established the Modeling and Simulation Steering Committee (M&S SC) as the governing body for M&S activities and investments through DoDD 5000.59. These changes support an enterprise approach to M&S capability investment, development and deployment. The resulting three-tiered governance structure follows:

Modeling and Simulation Steering Committee (M&S SC)



A representative designated by USD (AT&L) chairs the M&S SC, which is comprised of representatives of the four Services, components from the six DoD Communities enabled by M&S, and the Joint Staff. The six DoD Communities represented are: Acquisition, Analysis, Planning, Testing, Training, and Experimentation. The M&S SC mission is to provide an enterprise focus to coordinate all matters related to DoD M&S and support collaboration among, and implementation by, the Communities, the Joint Staff and the Services.

The M&S SC advises and assists the USD (AT&L) on all matters concerning M&S, helps develop DoD issuances to manage M&S, establishes policies and procedures, and determines near, mid- and long-term direction consistent with the DoD Strategic Vision for M&S. The “Steering Committee” approach ensures three things: policies that are enterprise level, policies that are Department-wide and policies that optimize M&S oversight and transparency. In 2007, the Steering Committee authored a strategic Vision and Goals document for DoD M&S and directed development of six functional Community Business Plans.

Modeling and Simulation Integrated Progress Team (M&S IPT)

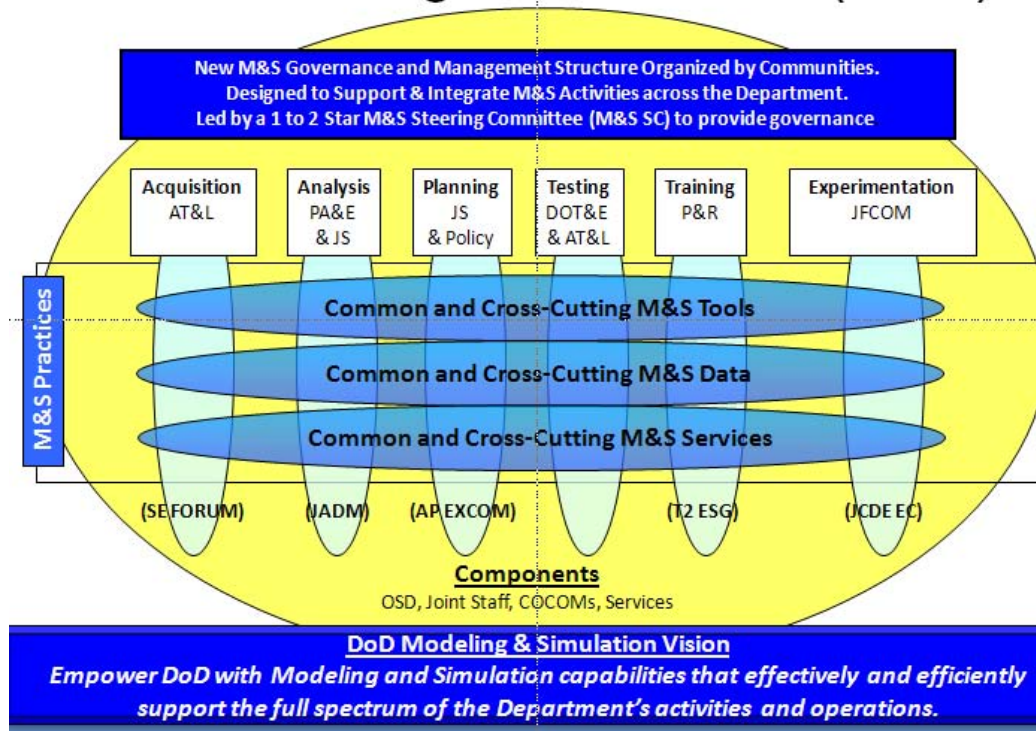
The Integrated Process Team supports the M&S SC in managing enterprise activities through the implementation of approved corporate and crosscutting strategies, investments, and guidance. The M&S IPT identifies and recommends issuances necessary for effective M&S planning. Members or their representatives serve on subcommittees established by the M&S SC as needed to consider, investigate, advise, take action and report on specific problems or subject areas as requested. Members of the M&S IPT are drawn at a senior level from the same organizations that comprise the M&S SC.

This enterprise governance approach aligns the processes, structures and authorities to provide effective oversight and management of activities and investments. In addition, this approach supports DoD-wide business and warfighter capabilities that rely on M&S. The roles, responsibilities and procedures to support this governance are codified in the March 2008 Draft “M&S Management Operating Rules” document. The draft Operating Rules facilitate Department-wide collaboration and promotes interaction with partners including other government agencies, allies, industry, and academia.

Modeling and Simulation Coordination Office (M&S CO)

M&S CO functions under the guidance of the Director Defense Research and Engineering (DDR&E) within the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics (USD (AT&L)). The office proactively coordinates six Communities, four Services, Joint Staff and a multitude of programs to ensure strategic cohesion of modeling and simulation activities at the Department level including combinations of live, virtual, and constructive capabilities for acquisition decision-making, programmatic analysis, experimentation, operational planning, testing, training, mission rehearsal, and doctrine development.

DoD Modeling & Simulation (M&S)



M&S CO seeks to identify and maintain visibility in all current and planned DoD-wide modeling and simulation activities. The intent is to support the development of a set of applicable standards and ensure the interoperability and reuse of related technologies and methodologies, while achieving a viable, common technical framework for M&S tools, data, and services interoperability and reuse.

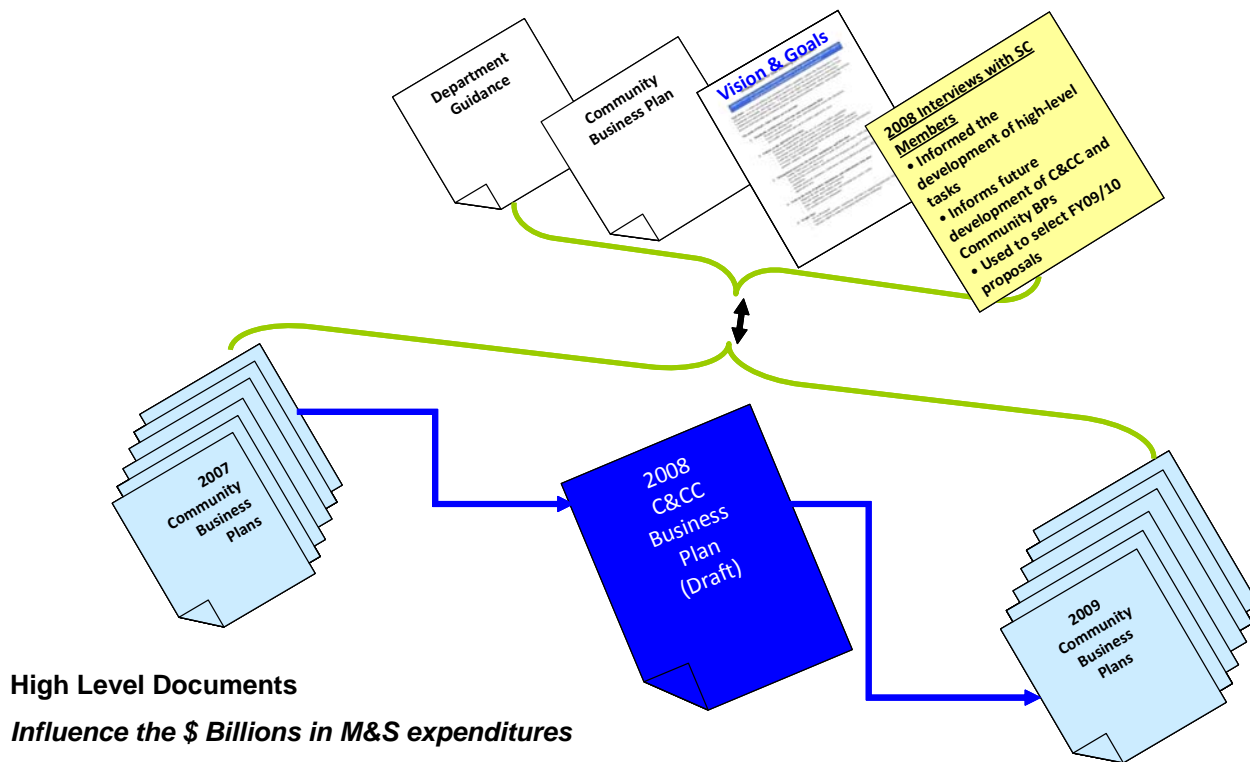
Department Guidance

This 2008 M&S Corporate and Crosscutting Business Plan supports DoDD 5000.59, and the M&S Strategic Vision, Goals and Objectives by providing specific guidance and insight into the roles of M&S within the larger Department framework of strategies. Among the DoD documents used to develop this Corporate and Crosscutting Business Plan were the Quadrennial Defense Review (QDR) 2006, U.S. National Defense Strategy (NDS) 2008, community M&S business plans, and Guidance for Development of the Force (GDF) 2008.

These documents provide Departmental level policy and strategic guidance for DoD enterprise M&S planning and program activities. The Corporate and Crosscutting Business Plan provides entities involved in M&S activities a long-term framework through the Goals and Objectives for future input and policy development at the Department level as new guidance documents are developed and published.

Community Business Plans

The M&S Community Business Plans from Acquisition, Analysis, Planning, Testing, Training, and Experimentation provide an additional foundation for this document. These plans detail each Functional Community's strategic direction, initiatives, investments, and desired outcomes. In addition, M&S CO conducted interviews with nearly all M&S SC senior executives to ensure currency of data and perspective in the formation of the M&S Objectives outlined in this plan.





Modeling and Simulation supports real world applications that save lives.

Strategic Vision and Goals

In August of 2007, the M&S SC published and signed the “Strategic Vision for Modeling and Simulation” which defined the following strategic vision: “*Empower DoD with modeling and simulation capabilities that effectively and efficiently support the full spectrum of the Department’s activities and operations.*” The M&S SC identified five goals that support achievement of the DoD Strategic Vision for modeling and simulation. The goals of DoD’s M&S effort are to provide:

Standards, architectures, networks and environments that:

- Promote the sharing of tools, data, and information across the enterprise
- Foster common formats
- Are readily accessible and can be reliably applied by users

Policies at the enterprise level that:

- Promote interoperability and the use of common M&S capabilities
- Minimize duplication and encourage reuse of M&S capabilities
- Encourage research and development to respond to emerging challenges
- Limit the use of models and data encumbered by proprietary restrictions
- Leverage M&S capabilities across DoD, other government agencies, international partners, industry, and academia.

Management processes for models, simulations, and data that:

- Enable M&S users and developers to easily discover and share M&S capabilities and provide incentives for their use
- Facilitate the cost-effective and efficient development and use of M&S systems and capabilities
- Include practical validation, verification, and accreditation guidelines that vary by application area.

Tools in the form of models, simulations, and authoritative data that:

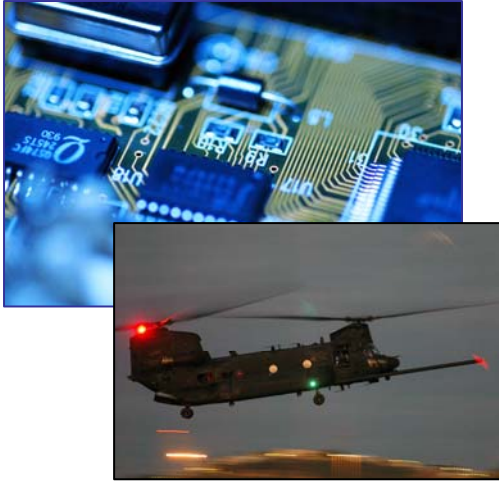
- Support the full range of DoD interests
- Provide timely and credible results
- Make capabilities, limitations, and assumptions easily visible
- Are useable across communities.

People that:

- Are well-trained
- Employ existing models, simulation, and data to support departmental objectives
- Advance M&S to support emerging departmental challenges.

Strategic Objectives

The M&S SC identified three Strategic Objectives as the core focus through FY10 and beyond, determining that progress against these areas will have significant impact and improvement in the efficacy of DoD modeling and simulation capabilities long-term.



The development of interoperable commercial and non-commercial applications supported by interdependent infrastructures including cyberspace, provides an opportunity to achieve agile, dispersed yet integrated M&S capabilities.

Strategic Objective 1: Standards

Achieve a set of standards for the development, integration, and conduct of DoD modeling and simulation activities.

Designation of standards, which effectively incorporate a wide range of M&S disciplines, sciences, and Community legacy taxonomies, is a complex matter. The inconsistency of definitions and representations complicates development, deployment, and re-use of tools, data, and services. In addition, the use of interoperable systems, multi-dimensional models and simulations at the enterprise level has increased the focus on standards. The M&S SC has identified standards as an important focus including the need to establish a common taxonomy for accuracy of language among Communities, Services, vendors and other stakeholders. The M&S Community has begun development of a reference taxonomy, which will continue to evolve with the designation and application of standards. Selected standards should include those identified/developed for use by Functional Components, where appropriate.

Strategic Objective 2: Interoperability

Drive towards integrated modeling and simulation (tools, data, and services) across Department activities.

As nearly all aspects of the operational environment have become technology enabled, the requirement to interconnect varied M&S activities with the other battlespace requirements has increased exponentially. The development of interoperable commercial and non-commercial applications provides an opportunity to leverage M&S capabilities that support a broad spectrum of participants including joint, interagency, allies, partners, and others in a range of diplomatic, information, military and economic activities. The M&S SC has identified interoperability as a key element in maximizing current M&S investments, and development of new and more advanced M&S capabilities.



The ability to re-use numerous M&S related activities Department-wide could result in reduced development to deployment cycles, efficiency in resource allocation, and new best practices.

Strategic Objective 3: Visibility

Facilitate use and reuse of M&S tools, data and services through increased transparency by ensuring access to accurate, authoritative and reliable data.

M&S capability development, historically centered on highly specific operational and training requirements using dedicated processes and programs. Interoperable and inter-connected systems, however, provide the ability to cost-effectively modify and re-use tools, data, and services offering a significant opportunity to leverage existing knowledge and programs. The ability to re-use numerous M&S related activities Department-wide could result in reduced development to deployment cycles, efficiency in resource allocation, and new best practices. An accurate, comprehensive, and malleable knowledge management database with supporting policies and structures is necessary to fully access and utilize activities across the Department. The M&S SC has identified increasing visibility as critical to completing the Department's management transformation of M&S activities initiated in 2006.

Individually the Objectives identified by the M&S SC represent significant areas of focus for the Department to enhance current and future M&S activities. Combined, these Objectives represent a strategic shift from a legacy of individual programs and activities to a paradigm of shared knowledge, leveraged resources, and interoperable tools, data, and services that optimize the Department's M&S resources and capabilities in support of the warfighter.

Strategic Challenges

The M&S SC identified four strategic challenges that are common across all M&S activities. Each of these challenges, listed below, is inherent within the five Goals and three Strategic Objectives identified and will be key factors weighed in the development of the policies, investments, and actions necessary to enact this document.



As military forces continue to conduct a range of traditional and non-traditional missions, there is an increased requirement to build models and simulations that represent the influences of culture on behavior and reasoning.

Proprietary Technology

The historic pattern of modeling and simulation development traditionally manifested highly specific, limited use, proprietary models, and “stove-piped” programs. With the advent of adaptive and interoperable technologies, increasing costs of capability development, and the emergence of joint requirements, the need to minimize proprietary use and promote exchange is important to the optimization of modeling and simulation capabilities. One reason for the institutionalization of the M&S SC is to better identify opportunities for shared development, exchange, or re-use. The M&S SC identified the need to raise the level of DoD-wide visibility of M&S activities as referenced in the M&S Strategic Goals. This improved visibility helps disseminate robust methodologies for informing and exchanging tools, data, and services across the Department.

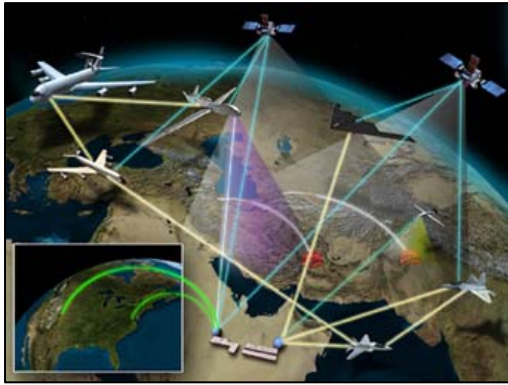
Systems of Systems

The rapid evolution of “systems of systems”-, that is, combinations of task-oriented systems that pool their resources and capabilities and interactively establish new, more complex, functioning networks – pose significant challenges to the design, development and operation of M&S capabilities. Among these challenges, tools, data, and services that must integrate seamlessly with a variety of legacy systems and the network-centric environment. The evolution of complex inter-related networks is driving the need for greater commonality, taxonomical consistency and standards, to ensure systems integrate and operate effectively. M&S SC has identified three Strategic Objectives in this document; the development and publishing of *Standards*, increasing system *Interoperability* and promotion of tool and data *Visibility* to improve future systems of systems development.

Irregular Warfare

The 2006 QDR identified the presence of the Irregular Warfare (IW) battlespace as a long-term determining factor in shaping U.S. force structure, deployment, training, and support requirements.

As military forces continue to conduct a range of traditional and non-traditional missions, the requirement to build models



The M&S SC has identified elements within three Strategic Objectives designed to facilitate the development and sharing of M&S tools, data, and services in an increasingly cyberspace dominated information environment.

and simulations that represent the influences of culture on behavior and reasoning increases. The development of authoritative representations of friendly, neutral or antagonistic forces and populations that are encountered in IW, as well as in modeling social networks, will continue to be a significant challenge.

Cyberspace Domain

The M&S opportunities and challenges posed by cyberspace and its effects on air, land, sea and space operations have yet to be fully realized. The M&S SC has identified elements within the three Strategic Objectives designed to facilitate the development and sharing of M&S tools, data, and services in an information environment increasingly dominated by cyberspace. This includes development of standards to improve cross-functional development, increase interoperability, and promote integrated activities supported by cyberspace infrastructure, and an increase in awareness of DoD-wide capabilities and gaps.

Each of these Strategic Challenges impacts development, deployment, and sharing of M&S tools, data and services and includes imperatives to reduce proprietary systems, promote interoperability and share information.

Study and Implementation

The 2008 M&S Corporate and Crosscutting Business Plan Objectives focus on the development and fielding of common tools, methodologies, and data, establishment of standards and protocols promoting readiness, interoperability, data exchange, open system architecture, and software reusability of applications in alignment with DoD Directive 5000.59, “DOD Modeling and Simulation (M&S) Management.” To achieve progress in these areas for fiscal years 2009 and 2010 towards the 2010-2015 POM, several follow-on steps are required, most notably identification of the critical high level tasks and the development of an Implementation Plan to measure progress on tasks against owners, milestones, and metrics.



M&S provides strategic operations and support functions to our military.

High Level Task Development

M&S CO coordinates the development and publishing of the High Level Tasks identified in the Business Plan. The M&S SC approved High Level Tasks document is a focal point for DoD M&S activities in the process of determining investment of monetary, human, and technological resources within DDR&E Plans and Programs. The follow-on Implementation Plan will execute the tasks to ensure owners, milestones and metrics are identified and tracked to ensure effective and timely execution.

Implementation Planning

This 2008 M&S Corporate and Crosscutting Business Plan will be accompanied by an Implementation Plan that identifies and executes the High Level Tasks, and identifies investments, action, owners, milestones and metrics necessary to achieve the Strategic Goals and Objectives. This Implementation Plan will be aligned with the “M&S Management Operating Rules”² published by the M&S SC, and in particular, the Project Selection and Evaluation Processes contained within that document.

The M&S SC will initiate and coordinate project selection and ensure proper execution of projects. The completion of the High Level Tasks and the Implementation Plan will provide a means to validate requirements, identify capabilities and allocate resources against the most critical gaps in capabilities. Completion of the High Level Tasks and Implementation Plan will also support development of updated Community Business Plans in FY09 and an updated Corporate and Crosscutting Business Plan in FY10.

² *Modeling and Simulation Management Operating Rules*, March 2008 (Draft), Modeling and Simulation Coordination Office (M&S CO).

Summary

This 2008 M&S Corporate and Crosscutting Business Plan, with the Vision, Goals, and Objectives serves as an important step in furthering a focused, collaborative and adaptive approach to M&S within the Department of Defense. With it, the M&S SC has identified the most pressing modeling and simulation requirements of the Department at this time and the desire to meet them through standardized, interoperable, and transparent tools, data and services, wherever possible. Executing the High Level Tasks as part of the Implementation Plan will help the M&S SC balance FY 09 and FY 10 investments, reduce costs, increase capability throughput, and promote reuse, while ensuring an environment focused on commonality of purpose and commitment to the warfighter.



Modeling and Simulation is an Enabler, not an End State.

Reference Documents

U.S. National Defense Strategy (2008)

Quadrennial Defense Review Report (February 2006)

Guidance for Deployment of the Force, 2008, Department of Defense (Classified)

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Acquisition Modeling and Simulation Master Plan, April 2006, Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (AT&L)

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Visions of Transformation 2025 – Shocks and Trends, February 2007, Presentation by Dr. Thomas Mahnken, Deputy Assistant Secretary of Defense for Policy Planning, Office of the Secretary of Defense (OSD) at Naval Post Graduate School.

Report on Department of Defense Joint Modeling and Simulation Activities, January 2009, Office of the Director, Defense Research & Engineering

Appendix: Modeling and Simulation High Level Tasks

Standards (S) Objectives

- S-C-1: M&S Standardization Process
 - Define and establish an M&S standards process
 - Develop an M&S standards profile; Standards vetting tool; register M&S standards
- S-C-2: LVCAR Implementation, and Net-Centric Environment Implications
 - Implement select LVCAR recommendations
 - Determine how to integrate LVC into the net-centric environment and SOA
- S-C-3: Develop and maintain M&S standards
 - Develop and/or update M&S documents (MDR, VVA RPG, M&S Glossary, etc)
 - Maintain HLA, SEDRIS, M&S DMDS, VVA Documentation Tool
 - Support NATO M&S bodies
- S-C-4: Develop Best Practices Guide for Contracting (proprietary issue)
 - Identify inconsistencies in DoD procurement with respect to M&S tools, data, and services
 - Develop BPG for M&S and associated data procurement and contracting

Interoperability (I) Objectives

- I-C-I: Integrate M&S into the Net-Centric Environment
 - Determine requirement to leverage NCES and SOA
 - Develop and codify best practices, policies, and procedures
 - Transform source data into model-ready formats

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- Develop management strategy to synchronize all RDG efforts
- I-C-2: Rapid Data Generation
 - Transform source data into model-ready formats
 - Develop management strategy to synchronize all RDG efforts
- I-C-3: Enhancing Department Irregular Warfare Models and Simulations
 - Improve IW M&S – focus on human behavior representation

Visibility (V) Objectives

- V-AQ-2: Risk Based Methodology for VV&A
 - Develop methodology to understand the cost vs. risk of VV&A implementation
 - Update the VV&A RPG and Defense Acquisition Handbook
- V-C-1: Visibility of M&S tools and data
 - Discovery process for tools and data, consistent with net-centric tenets
 - Policies, procedures, guidance to enable discoverability across DoD
 - Identification and implementation of incentives for user participation
 - Improve access and sharing of credible IW data
 - Establish validation standards for IW models by application area

